U.S. Fish & Wildlife Service

Santee

National Wildlife Refuge Climate Change Impacts

Climate change has been described as the most compelling conservation challenge of our time. Accelerating climate change will affect our nation's fish, wildlife, and plant resources in profound ways. While many species will continue to thrive, some populations may decline and in some instances, go extinct. Others will survive in the wild only through direct and continuous intervention by managers. This defining challenge for the conservation community requires the U.S. Fish and Wildlife Service and its employees and partners to apply the skill, determination, creativity and commitment to conserving the nation's natural resources that have defined the American conservation movement since its inception more than 130 years ago.

The U.S. Fish and Wildlife Service's draft Climate Change Strategic Plan establishes a basic framework within which the Service and its employees will work as part of the larger conservation community to help ensure the sustainability of fish, wildlife, and habitats in the face of accelerating climate change. The plan employs three key strategies to address climate change: Adaptation, Mitigation, and Engagement. Adaptation refers to planned management actions the Service will take to help reduce the impacts of climate change on fish, wildlife, and their habitats. Mitigation involves reducing our "carbon footprint" by using less energy, consuming fewer materials, and appropriately altering our land management practices. Engagement involves reaching out to Service employees; local, national and international partners in the public and private sectors; key constituencies and stakeholders; and the broader citizenry of this country to join forces and seek solutions to the challenges to fish and wildlife conservation posed by climate change.

Santee National Wildlife Refuge and the U.S. Fish and Wildlife Service are committed to helping reduce the impact of climate change on our natural resources. With monitoring and research partnerships, staff committed to leading the conservation effort on climate change, and proactive support from the public, we are applying sound science to our management decisions to minimize impacts of climate change on fish and wildlife populations and their habitats.

Increasing Temperatures and Decreasing Precipitation Will Augment Warmer, Dryer Conditions

Temperature and Precipitation Change in the Southeast

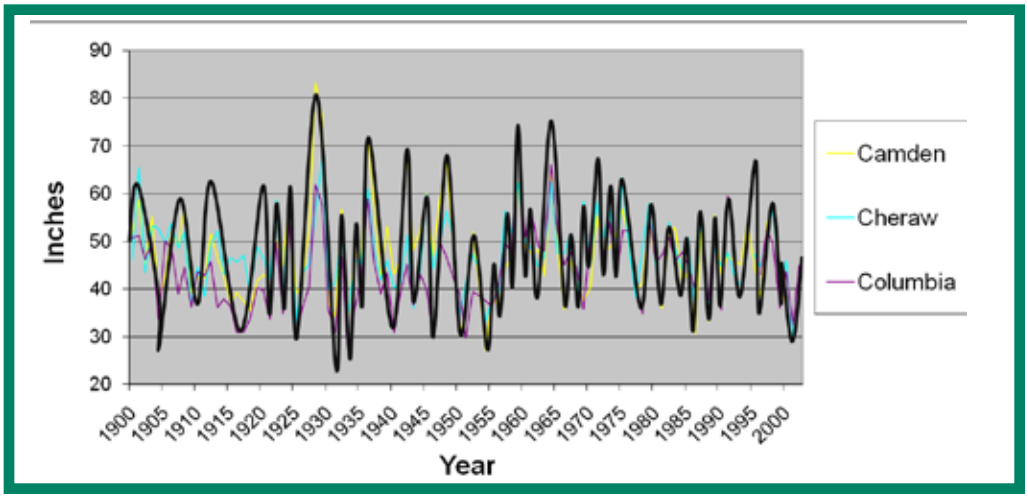
	Temperature Change in °F		Precipitation change in %	
	Average 1901-2008	Between 1970-2008	Average 1901-2008	Between 1970-2008
Annual Change	0.3	1.6	6.0	-7.7

Based on long-term rainfall patterns in central South Carolina, severe drought occurred in years with 30 inches of annual rainfall or less. Average annual rainfall for the Santee NWR area is about 49 inches. Under drought conditions, the refuge is unable to effectively manage wetlands and wildlife impoundment habitats. Uncertainties for future water availability includes human consumption, agriculture, energy, cooling, public recreation, and natural resource management.

Change in Species Occurrence

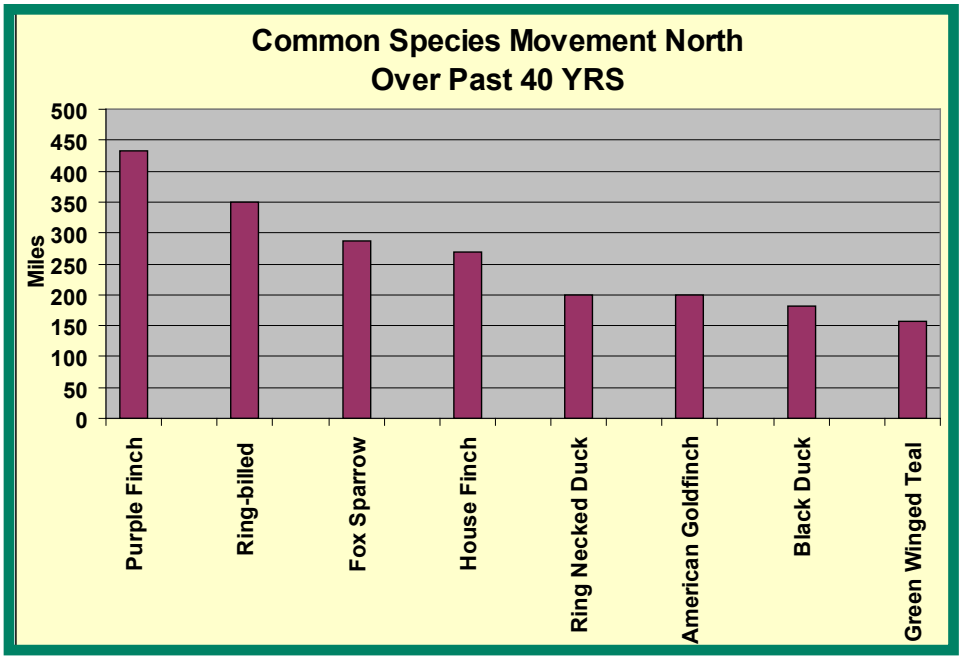
- Decreasing populations of wintering geese and ducks on the refuge may be caused by a greater food source (insects, plants) remaining in northern ranges. According to National Audubon Society, migratory bird patterns have been changing drastically over the past 40 years. Will these species still remain on the refuge in 100 years?
- In recent years, observations by refuge staff have shown that southern species are expanding their range and starting to move into areas where they have not been seen historically. Examples include fulvous whistling ducks (summer), sandhill cranes (winter) and wood storks (summer, fall).
- Other changes in South Carolina species include (SC DNR Office of the State Climatology):
  - Mass die off of forested areas if a CO2 induced warming occurs too rapidly that forests would not be able to adjust in time.
  - Mature forests may not occur, but farmlands left unplanted may remain as grasslands in drier conditions.
  - Southern hardwood species (black gum, laurel oak, elm) may replace loblolly pine forests.
  - Pest species range will increase, and areas stressed by higher temperatures and drought conditions will be more susceptible to disease.
  - Establishing conservation partnerships with neighboring landowners and organizations throughout the state to protect private lands.
  - Improve habitat connectivity; less fragmentation of habitat will allow for species movement to be uninterrupted by human development.
  - Education and outreach to the local community and beyond. Staying informed of current research and being a part of observation and monitoring projects on the refuge.
  - Biological inventories-documenting change and shift in species occurrence.

Long-Term Precipitation in Selected Locations SC upper Coastal Plain (1900-2005)



Among habitats that could be affected, are unique systems like the Dingle Pond Carolina Bay, which is located on Santee NWR. These are isolated wetlands completely dependant on hydrology and water levels. Santee's wetland impoundment system and forested bottomland wetlands will be vulnerable as well.

At other locations, ecologists are researching how amphibians, plants, and zooplankton adapt to such change. Scientists are developing a computer-based model that could predict the effects of climate change on zooplankton and other animals that utilize this unique habitat type. (University of Georgia Savannah River Ecology Lab).



Santee National Wildlife Refuge
2125 Fort Watson Road
Summerton, South Carolina 29148
Phone: 803/478 2217
http://www.fws.gov/santee